

IN THE CLAIMS:

Please cancel Claims 1 - 29 and 61 - 65 without prejudice.

1 - 29. (Cancelled)

30. (Previously Presented) A method of preventing etch byproduct particulates generated from during etching a noble metal, which byproducts are nonvolatile at a substrate temperature at which said noble metal is etched, and which accumulate in a plasma etch chamber in which said noble metal is etched, from adversely affecting an etch process subsequently performed in a said plasma etch chamber, wherein said method comprises:

a) placing a substrate in said plasma etch chamber , wherein said substrate specially provides a source of a particulate entrapment or adhering material; and

b) exposing said substrate, chamber walls, and internal apparatus surfaces of said plasma etch chamber to a seasoning plasma generated from a source gas that includes at least one principal etchant gas used during an etch process which produced said nonvolatile etch byproducts, at a substrate temperature that is equal to or greater than a substrate temperature at which said nonvolatile etch byproducts were produced,

whereby exposure of said substrate to said seasoning plasma generates an entrapment and adhering material which adheres said nonvolatile etch byproducts to chamber walls and internal apparatus surfaces.

31. (Cancelled)

32. (Original) The method of Claim 31, wherein said substrate includes an inorganic material which provides a source for said entrapment and adhering material.

33. (Original) The method of Claim 32, wherein said method is performed at a substrate temperature of 250°C or greater.

34. (Original) The method of Claim 32, wherein said method is performed at a substrate temperature less than 250°C.

35. (Original) The method of Claim 31, wherein said substrate includes an organic material which provides a source for said entrapment and adhering material, and wherein said method is performed at a substrate temperature less than 250°C.

36. (Original) The method of Claim 30, wherein said seasoning plasma includes a gas which provides a source for said entrapment and adhering material.

37. (Original) The method of Claim 37, wherein said seasoning plasma includes a carbon-containing gas.

38. (Original) A method of preventing particulates generated from metal etch byproducts, which are nonvolatile at a substrate temperature at which said metal is etched, from adversely affecting an etch process subsequently performed in a plasma etch chamber in which said metal was etched, wherein said method comprises:

a) placing a substrate which includes a material which provides a source for an entrapment and adhering material; and

b) exposing said substrate, chamber walls, and internal apparatus surfaces of said plasma etch chamber to a seasoning plasma generated from a gas selected from the group consisting of Cl₂, a chlorine-containing compound, and combinations thereof, at a substrate temperature that is equal to or greater than a substrate temperature at which said nonvolatile etch byproducts were produced,

wherein exposure of said substrate to said seasoning plasma generates said entrapment and adhering material which adheres said nonvolatile etch byproducts to chamber walls and internal apparatus surfaces.

39. (Original) The method of Claim 38, wherein said substrate includes an inorganic material which provides a source for said entrapment and adhering material.

40. (Original) The method of Claim 39, wherein said inorganic material is a dielectric selected from the group consisting of silicon oxide, silicon nitride, aluminum oxide, and combinations thereof.

41. (Original) The method of Claim 39, wherein said method is performed at a substrate temperature of 250°C or greater.

42. (Original) The method of Claim 41, wherein a metal which is etched within said plasma etch chamber is selected from the group consisting of platinum, iridium, and combinations thereof, and wherein said method is performed at a substrate temperature of at least 260°C, for a time period ranging from about 2 minutes to about 30 minutes.

43. (Original) The method of Claim 39, wherein said method is performed at a substrate temperature less than 250°C.

44. (Original) The method of Claim 43, wherein a metal which is etched in said plasma etch chamber is copper, and wherein said method is performed at a substrate temperature of at least 210°C, for a time period ranging from about 2 minutes to about 30 minutes.

45. (Original) The method of Claim 43, wherein a metal which is etched in said plasma etch chamber is selected from the group consisting of a nickel-iron alloy, a cobalt-iron alloy, and a nickel-iron-cobalt alloy, and wherein said method is performed at a substrate temperature of at least 25°C, for a time period ranging from about 2 minutes to about 30 minutes.

46. (Original) The method of Claim 38, wherein said substrate includes an organic material which provides a source for said entrapment and adhering material, and wherein said method is performed at a substrate temperature less than 250°C.

47. (Original) The method of Claim 46, wherein said organic material is a photoresist.

48. (Original) A method of preventing particulates generated from metal etch byproducts, which are nonvolatile at a substrate temperature at which said metal is etched, from adversely affecting an etch process subsequently performed in a plasma etch chamber in which said metal was etched, wherein said method comprises:

a) placing a substrate which provides a source of a dielectric material in said plasma etch chamber; and

b) exposing said substrate, chamber walls, and internal apparatus surfaces of said plasma etch chamber to a seasoning plasma generated from a gas selected from the group consisting of Cl₂, a chlorine-containing compound, and combinations thereof, at a substrate temperature that is equal to or greater than a substrate temperature at which said nonvolatile etch byproducts were produced,

wherein exposure of said substrate to said seasoning plasma generates said dielectric material which adheres said nonvolatile etch byproducts to chamber walls and internal apparatus surfaces.

49. (Original) The method of Claim 48, wherein said metal is selected from the group consisting of platinum, iridium, copper, a nickel-iron alloy, a cobalt-iron alloy, a nickel-iron-cobalt alloy, and combinations thereof.
50. (Original) The method of Claim 48, wherein said dielectric material is selected from the group consisting of silicon oxide, silicon nitride, aluminum oxide, and combinations thereof.
51. (Original) The method of Claim 48, wherein said seasoning plasma further includes a noble gas selected from the group consisting of argon, helium, xenon, krypton, and combinations thereof.
52. (Original) The method of Claim 51, wherein said seasoning plasma is generated from a gas mixture comprising Cl_2 and argon, wherein Cl_2 comprises about 50 to about 90 volume %, and argon comprises about 10 to about 50 volume %, of said gas mixture.
53. (Original) The method of Claim 52, wherein Cl_2 comprises about 60 to about 80 volume %, and argon comprises about 20 to about 40 volume %, of said gas mixture.
54. (Original) The method of Claim 51, wherein said seasoning plasma is generated from a gas mixture comprising Cl_2 , argon, and N_2 , wherein Cl_2 comprises about 40 to about 90 volume %, argon comprises about 10 to about 50 volume %, and N_2 comprises about 1 to about 20 volume %, of said gas mixture.
55. (Original) The method of Claim 54, wherein Cl_2 comprises about 60 to about 80 volume %, argon comprises about 10 to about 30 volume %, and N_2 comprises about 5 to about 20 volume %, of said gas mixture.

56. (Original) The method of Claim 48, wherein said seasoning plasma is generated from a source gas comprising Cl_2 and a chlorine-containing compound selected from the group consisting of HCl , BCl_3 , SiCl_4 , and combinations thereof.

57. (Original) The method of Claim 56, wherein said source gas further includes a gas which enhances dissociation of said chlorine-containing compound into active chlorine species.

58. (Original) The method of Claim 57, wherein said chlorine-dissociation-enhancing gas is selected from the group consisting of N_2 , NH_3 , and combinations thereof.

59. (Original) The method of Claim 48, wherein said seasoning plasma is generated from a source gas comprising a chlorine-containing compound selected from the group consisting of HCl , BCl_3 , SiCl_4 , and combinations thereof, and wherein said source gas further includes a gas which enhances dissociation of said chlorine-containing compound into active chlorine species.

60. (Original) The method of Claim 59, wherein said chlorine-dissociation-enhancing gas is selected from the group consisting of N_2 , NH_3 , and combinations thereof.

61 - 65. (Cancelled)